

## **ABSTRACT OF THE DISCLOSURE**

Methods for slice-based encoding of program guides and user interfaces. The program guides include multiple video streams for picture-in-picture and other applications. A method for encoding the program guide includes encoding a first set of slices for each of a plurality of graphics pages; and encoding a second set of slices for each of a plurality of video streams. The user interfaces are multi-functional and may be used for electronic commerce and other applications. A method of generating the user interface includes encoding a set of slices for each of a plurality of objects, each object being characterized by an identity, at least one attribute, and at least one operation. In one embodiment of this method, the plurality of objects include an electronic commerce object, where the electronic commerce object is attributed with a first hyper text markup language (HTML) page. A head-end centric system and apparatus for encoding and delivery of realtime content, including: a non-realtime content source for providing non-realtime content; a non-realtime encoder for encoding the non-realtime content into encoded non-realtime content; a realtime encoder source for providing realtime video and audio content; a realtime encoder for encoding the realtime video and audio content into encoded realtime video and audio; a remultiplexor for repacketizing the encoded non-realtime content and the encoded realtime video and audio into transport packets; and a re-timestamp unit coupled to the remultiplexor for providing timestamps to be applied to the transport packets in order to synchronize the realtime and non-realtime content therein.